Claims

1. A method of forming a geopolymer molded product comprising: forming a geopolymer concrete composition comprising a mixture of an alumino silicate component an alkali or alkaline earth metal silicate component, an alkali or alkaline earth metal hydroxide, aggregate and water wherein the water content is insufficient to provide a slumped concrete and the weight ratio of SiO_2 to M_2O wherein M is an alkali metal is in the range of from 0.8 to 1.2; and casting the concrete into a mold; and subjecting the molded concrete to consolidation in the mold.

2. A method according to claim 1 wherein a metal M is at least one of sodium and potassium.

3. A method according to claim 1 wherein the ratio of SiO_2 to M_2O is at least 0.9.

4. A method according to claim 1 wherein the ratio of SiO_2 to M_2O is at least 0.95.

5. A method according to claim 1 wherein M_2O is Na_2O and the ratio of SiO_2/Na_2O is in the range of 0.9 to 1.2.

6. A method according to claim 1 wherein at 15 minutes after mixing the concrete has a Vebe time in the range of from 15 to 40 seconds.

7. A method according the claim 6 wherein at 30 minutes the concrete has a Vebe time in the range of 15 to 50 seconds and at 45 minutes the concrete has a Vebe time of from 15 to 60 seconds.

8. A method according to claim 1 used in the molding of concrete products.

9. A method according the claim 1 used in the formation of molded pipe by methods selected from the group consisting of centrifugal processes, roller suspension process and vertical casting processes.

10. A method according to claim 1 wherein the aluminosilicate material is selected from the group consisting of fly ash, ground blast furnace slag, metakaolin, silica fume, synthetic aluminosilicate, scoria and pumice.

11. A method according to claim 1 wherein at least 70% by weight of the aluminosilicate binder component is fly ash.

12. A method according to claim 1 wherein the aluminosilicate component further comprises an aluminosilicate selected from the group consisting of ground granulated blast furnace slag and Portland cement.

13. A method according to claim 1 wherein the aluminosilicate component comprises at least 70% by weight of fly ash, blast furnace slag in an amount of up to 30% by weight and wherein the composition further comprises ordinary Portland cement in an amount of up to 8% by weight of the total weight of the aluminosilicate binder component.

14. A method according to claim 1 comprising the following components by weight of the total weight of dry components as follows:

40 to 60%	course aggregate;
20 to 45%	sand;
10 to 20%	fly ash;
0.5 to 2%	sodium silicate; and
0.2 to 0.6%	sodium hydroxide.

15. A method according to claim 1 wherein from half to two thirds of the total water content of the concrete having a water content insufficient to provide a slumped concrete is added to the composition following mixing of the metal hydroxide component and at least part of the aggregate and optionally other components.

16. A method according to claim 1 wherein forming the geopolymer concrete includes the steps of forming a mixture of at least part of the aggregate

component with the metal hydroxide and combining the mixture of metal hydroxide and at least part of the aggregate with a binder comprising aluminosilicate material and an activator comprising metal silicate.

17. A method of preparing a geopolymer concrete according to claim 16 wherein at least 50% of the total aggregate component is present in the mixture with the aggregate and metal hydroxide.

18. A method of preparing a geopolymer concrete according to claim 16 wherein the aggregate mixed with the metal hydroxide has a water content of less than 0.8% of the total mass of components.

19. A method of preparing a geopolymer concrete according to claim 16 wherein the geopolymer concrete composition is case into a mold and compacted into the mold.

20. A method according to claim 16 wherein the concrete composition is case into a pipe mold by a process selected from the group consisting of centrifugal pipe process, roller suspension process and vertical casting process.

21. A method according the claim 16 wherein the concrete is cast into a pipe mold by a process selected from centrifugal process and roller suspension process.

22. A method according to claim 16 wherein the geopolymer concrete is a no slump concrete.

23. A method according to claim 16 wherein the ratio of sand to stone in the composition is in the range of from 1:1.5 to 1:2.

24. A method according to claim 16 wherein water is present in the mixture of at least part of the aggregate component and metal hydroxide and further water is added with the remaining components and wherein the ratio of water present in the mixture of at least part of the aggregate component and metal

hydroxide to the water added with the remaining components is in the range of from 1:2 to 1:3.

25. A concrete pipe produce formed by the method according to claim 16.

26. A method according to claim 16 wherein the product is formed by compaction casting of the geopolymer concrete in a pipe mold.

27. A method according to claim 16 wherein the geopolymer concrete is compacted within the pipe mold by a process selected from the group consisting of the centrifugal process and the roller suspension process.